Psychological Influence and Intention to Use Web Based Health Information Service

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Abstract

Building on the Health Belief Model, the study attempts to examine the roles of outcome expectations, internal cues and external cues in predicting health consumers intention to use MyHEALTH Portal which is the Malaysian National Web based Health Information Service. Based on the results of the structural model, there are evidences for outcome expectations and internal cues to predict the health consumers intention to use MyHEALTH Portal. The findings provide valuable insights for the Malaysia Ministry of Health in identifying significant psychological factors in promoting the portal usage behaviour, which ultimately, help to achieve their long-term goal.

Keywords: psychological; intention to use; web-based health information service

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1.0 Introduction

The use of online health information service through Web-based Health Information Service (WBHIS) is potent to deliver up to date health information to health consumers which enable them to make healthy decision making. This paper highlights on significant psychological aspect that is relevant to the study of WBHIS as it has been shown in literature influenced health consumers' behavioural intention to use WBHIS. The findings may contribute to the literature by theorizing and testing how the psychological factor specifically the Health Belief Model (Rosenstock, 1974) may affect health consumers WBHIS usage intention along with the fact that there is paucity in the existing studies where psychological influence was found as limitedly studied as predictor variable within the area WBHIS and ehealth (Yun and Park, 2010; Xiao *et al*., 2014; Torres, 2011). The paper attempted to contribute in two distinct area; first, to provide new support to existing literature on the use of HBM as predictor for WBHIS usage intention. and; second, to produce new instrument that measure HBM-outcome expectations and cues to action (external) due to absence of empirical studies that investigate the constructs.

2.0 Theoretical Background and Research Hypotheses

The study which focuses on the adoption of Malaysia national WBHIS known as MyHEALTH Portal (MHP) is constructed from the Health Belief Model (Rosenstock, 1974). The model suggests health consumers' beliefs about their perceived benefits and barriers to the action and cues to action (external and internal cues) explain their engagement or lack of engagement in any health-promoting behavior (Janz and Becker, 1984; Rosenstock, 1974). And within the present study, two HBM measures are examined; outcome expectations and cues to action. Outcome expectation is comprised of perceived benefits and perceived barriers which are used together to determine evaluation of the course of action taken, meanwhile external and internal cues is necessary for prompting engagement in health-promoting behaviors (Rosenstock, 1974). Internal cues such as physiological cues e.g. pain and symptoms and external cues include events or information from close others, the media, or health care providers promoting engagement in health-related behaviors (Glanz *et al*., 2008). The research framework which explains the relationship is illustrated in Figure 1.

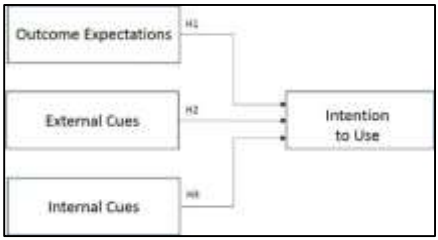

Fig. 1: Research Framework

The hypotheses included are;

H_1: Outcome expectations will positively influence health consumers' intention to use MHP

H_2: External Cues will positively influence health consumers' intention to use MHP, and,

H_3: Internal Cues will positively influence health consumers' intention to use MHP.

This study utilized an online survey to answer the research hypotheses. Identified population for the study is the users of MHP that accessed the portal at the official URL, www.myhealthportal.gov.my and age between 18 to 55 years old. A non-random sampling technique was selected in recruiting respondents for the study using the convenience sampling. The number of participants for this study was considered based on Hair *et al.* (2014, 2017) estimation for PLS-SEM which originated from Cohen's rule of thumb (1992). The study survey was hosted on the official MHP website. Two set of scales were used within the study, the first scale was used for outcome expectations, external cues and intention to use, which is on a continuum from 1 to 7. The "1" represents the level of "strongly disagree", and the "7" represents the degree of "strongly agree". The scale for internal cues was on a continuum from 1 to 5 with "1" generally represents the level of "very poor", and the "5" represent the degree of "very good". Absence of empirical studies investigating both constructs (outcome expectations and external cues) has led to its development which was primarily guided with the established conceptual definitions, also supported with related scientific literature concerning the constructs. The measurement items for outcome expectations were developed based on the construct definitions (Rosenstock, 1974; Glanz *et al*., 1997) and based on the findings from WBHIS qualitative studies from Jung and Berthon (2009), Powell *et al*. (2011) and Moreno *et al*. (2009). The next statement highlights some of the 14 items used within the study. "The experience to find required health information using the technology are: time-saving, convenient to access, high source credibility where information comes from professionals and less cost compare to other health information channels (e.g. visiting doctors)". The measurement items for external cues were developed based on the construct definitions using media as medium for health promotion activities (Janz and Becker, 1984; Carpenter, 2010). Using a seven-point Likert scale, respondents were required to answer the statements based on their level of agreement. Examples of the 13 items are; "I have seen the advertisement in local television, I have heard about the portal in local radio station, I have read somewhere regarding the portal in local newspapers/magazines".

Construct on internal cues were adopted from the validated scales of WHO Quality of Life (WHOQoL) BREF Questionnaire on Quality of Life, General Health, Physical Health and Psychological Health constructs (WHO, 1993). Two domains were adopted for this study that are physical and psychological health along with another two additional health facets that are; overall quality of life and general health. The cronbach's alpha for physical and psychological domains were reported as 0.82 and 0.80 (Skevington *et al*., 2004). The user measurement behavioural intention was adapted from Chau and Hu (2002) and Venkatesh et *al.* (2003) and had reliability value of 0.90.

4.0 Data Analysis

The hypotheses were tested by conducting the main analysis using the Partial Least Square (PLS) path modelling. Here, a two-stage analytical procedure was used to analyze the data. Firstly, a Confirmatory Factor Analysis (CFA) was conducted to assess the measurement model followed with the structural model to confirm on the proposed hypotheses.

4.1 Descriptive Statistics

Table 1. highlights the demographic details of the respondents participated within the study.

Table 1. Demographic details of the respondents within the study

Characteristics	Classification	*N*	Percentage (%)
Gender	Male	60	34.5
	Female	114	65.5
Age	18-19 years	3	1.7
	20-29 years	84	48.3
	30-39 years	73	42
	40-49 years	14	8
Race	Malay	162	93.1
	Chinese	11	6.3
	Indian	1	0.6
State	Selangor	56	32.2
	Johor	16	9.2
	Pulau Pinang	9	5.2
	Perak	10	5.7
	Pahang	4	2.3
	Negeri Sembilan	3	1.7
	Kedah	3	1.7
	Melaka	20	11.5
	Terengganu	8	4.6
	Kelantan	4	2.3
	Sabah	2	1.1
	Sarawak	10	5.7
	Kuala Lumpur	16	9.2
	Putrajaya	12	6.9
Occupational Level	Professional	58	33.3
	Support	43	24.1
	Student	64	36.8
	Self-employed	6	3.4
	Unemployed	4	2.3

5.0 Results

SmartPLS 3.0 statistical software applications was used to analyze the measurement and

structural model.

5.1 Measurement Model Assessment

The composite reliability of each construct for this study ranges from 0.898 to 0.963 and this is above the recommended threshold value of 0.70 thus, the results indicate that the items used to represent the constructs have satisfactory internal consistency reliability. A measurement model is said to have satisfactory indicator reliability when each item's loading is at least 0.7 and is significant at least at the level of 0.05 (T-value > 1.96) accounted for 95% confidence interval. There are two constructs in the measurement model exhibited indicator loadings exceeding 0.70 threshold value suggesting the items measured are reliable (intention to use and outcome expectations). However, for cues to action constructs both external and internal cues reported several outer loadings below the suggested threshold value. As a result, one item in external cues is retained since the difference from the threshold value is very slight that is 0.02, and one item is removed as the AVE value for the construct (external cues) is increased after item removal.

Meanwhile, indicator loadings below 0.40 should be eliminated (Hair *et al*., 2017) and this implied to two items in internal cues' construct. Also, another five items with loadings below 0.70 need to be removed to achieve the AVE threshold value of > 0.05. After removal, the PLS algorithm and bootstrap test are rerun and all items finally have demonstrated satisfactory indicator reliability and the measurement model's convergent validity is adequate and exceeded the recommended threshold value.

Next, the measurement model's discriminant validity is assessed by using three measures: 1) Fornell and Larcker's (1981) criterion, 2) cross loading and, 3) Hetetrotrait-Monotrait Ration (HTMT). All off-diagonal elements are lower than square roots of AVE. The result confirmed that the Fornell and Larker's criterion is met. Meanwhile, the loading of each block is higher than any other block in the same rows and columns which showed the cross loadings outpu thas confirmed that the second assessments of the measurement model's discriminant validity are satisfied. All HTMT values are clearly lower than the threshold value of 0.9 and neither of the confidence intervals includes the value of 1. The values of lower and upper bound for all relationship are ranging from 0.070 to 0.878 and this confirmed that the measurement model's discriminant validity are satisfied.

5.2 Structural Model Assessment

There are six key criteria for assessing the validity of the structural model which are: collinearity assessment, significance of the path coefficients, level of the R^2 values, f^2 effect size, predictive relevance (Q^2) and q^2 effect size. All constructs-VIF values are below the threshold of 5 (VIF < 5), therefore no collinearity exists. The result can further conclude that collinearity among the predictor constructs is not a critical issue in the structural model and the results report can be further continued.

Outcome expectations, external cues and internal cues are able to explain 58.6% of the variance in intention to use. R^2 values ranges from 0 to 1 with higher levels indicates higher levels of predictive accuracy. Following the rules of thumb, the R^2 values of intention to use (0.586) can be considered moderate (Hair, Ringle, and Sarstedt, 2011; Henseler *et al*., 2009).

The f^2 effect size of external cues were shown as no effect on endogenous variable (0.003). Meanwhile the f^2 effect size of outcome expectation and internal cues towards intention to use showed a medium and small effect size respectively (0.219, 0.107).

To further examine the model's capability to predict, blindfolding procedure was performed where the Q^2 value of the endogenous construct is considerably above zero which imply predictive relevance (Hair *et al.*, 2014, 2017). The results of q^2 effect sizes revealed outcome expectations have medium effect in producing predictive relevance for intention to use (0.152) while external cues showed no effect on the target construct (0.011). Finally, internal cues have small effect in producing the predictive relevance with the effect size value of 0.068. To confirm the significant effect of exogenous variables on endogenous variables despite the effect size and variance, a larger subsample of 5,000 is chosen to ensure the stability of results as suggested by Ringle, Wende and Becker (2015). Based on the t-statistics output, the significant level of each relationship is determined. The results indicate that all paths are statistically significant using a two-tailed test (t-value > 1.96) except for external cues (t=0.70). Table 2. below lists down the path coefficients, observed t-statistics, significance level values and the confidence intervals for all hypothesized path.

Table 2. Path coefficients, observed t-statistics, significance level values and the confidence intervals for all hypothesized path

Hypotheses	Relationship	Path coefficient	t Values	P values	Significance (p < 0.001)
H1	Outcome Expectation→ Intention to use	0.530	6.234	0.000	**
H2	External Cues → Intention to use	0.037	0.700	0.484	NS
H3	Internal Cues → Intention to use	0.218	3.533	0.000	**

*p<0.001**, NS-Not supported*

The assessment of the path coefficient in Table 2. shows supported hypotheses are significant at the level of 0.001, have expected sign directions (i.e., positive) and consist of a path coefficient value (β) ranging from 0.037 to 0.530. With regards to the predictor of health consumers' intention to use MHP, results showed outcome expectations and internal cues were found to be significantly and positively related to intention to use (β=0.530, t=6.234, p<0.001; β=0.218, t=3.533, p<0.001) and as a result, Hypothesis H1 and H3 were supported. However, the result did not provide support for the relationship between external cues and intention to use (β=0.037, t=0.700, p>0.001). This lead to the rejection of Hypothesis 2 and acceptance of null hypothesis. Thus, hypothesis 2 is rejected.

6.0 Discussion

This study suggested that MHP-outcome expectations positively influenced health consumers' intention towards MHP usage (β=0.530, t=6.234, p<0.001) and this determined it, as key important factor towards intentional use of MHP. This shows that within the study,

MHP offered greater extent of perceived benefits compared to perceived barriers which contributing to the acceptance of the portal. This result clearly supported Gehlert and Bollinger (2012) whom said, health behaviour is more likely to be carried out if benefits can be derived from performing the behaviour and outweigh the number of barriers to performing the behaviour, or some combination of these. Meanwhile, previous studies investigating this area also supports the perceived benefits of WBHIS as influenced the health consumers-intention to use such as in Moreno *et al*. (2009) where their work is based on the reviews of existing literatures and expert synthesis on the benefits and barriers of online health services among adolescents. Results in their reviewed study discovered some potential benefits of providing online health services to adolescents including improved their access towards health care sources, the level of health literacy, and their level of ongoing care.

In the study also, external cues have been identified not showing any significant influence on health consumers' intention to use MHP (β=0.037, t=0.700, p>0.001). This result is expected considering low score of the construct within the study (total mean=2.66). Several studies had confirmed lack of promotions and advertisements regarding the existence of WBHIS among health consumers contributed towards the result. This is strengthen with Inthiran (2010) study regarding Malaysian health seeking behaviour which concluded that Malaysian health consumers are unaware of the existence of available medical domains to search for relevant health information needs. This statement also includes MHP as one of reputable local medical domain available in Malaysia.

Finally, internal cues have been identified as significantly influenced the health consumers' intention to use MHP (β=0.218, t=3.533, p<0.001). Within the study, the result is expected considering the average score of the health construct among health consumers (internal cues) which were rated as moderate to good with higher internal cues' score indicates better physical, psychological and general health (total mean = 3.783). Overall, this result suggested that individuals' state of health meaningfully contributed towards their intention to use MHP where individuals with better health tend to engage with MHP. This result however was found inconsistent with previous studies that examined directly on users' health status towards WBHIS use (Wong *et al.,* 2012; McKinley and Ruppel, 2014). The inconsistencies throughout previous studies are differed by at least two diverse results for instance, Wong *et al.* (2012) investigated the predictors of Internet use to search for online health information among Chinese older adults. In that study, physical health and psychological health were found did not significantly correlate with behavioral intention for online health information although they possessed better physical and psychological health. Wong *et al.* (2012) argued this inconsistency may be explained by the cultural values of Chinese people where they are greatly emphasize on food intake, medicine, and tonic supplements (Li, 1995). Their traditional culture also highly values personal effort and believes that it is an essential element that leads to success in all aspects of life, including career and health domains (Kuo and Chang, 2004). Therefore, to maintain a healthy body, they tend to acquire all relevant information and recipes available in various available sources, and not necessarily depends on internet sources. Such beliefs in health might help to explain why perceived health was not a contributing factor towards their intention to use the Internet.

In contrary, another finding has explored on how perceived severity and self-efficacy of mental health predicted college students' use and perceptions of online mental health resources (McKinley and Ruppel, 2014). Results showed that perceived severity of mental health (psychological health) was not associated with use of online mental health resources. The result is contrast with Wong's *et al.* (2012) in which it indicates individuals experiencing perceived severity of mental health problems is not intent to use available online mental health resources. One implication is that possessing higher levels of severity and efficacy leads students to take more direct treatment-seeking actions (e.g. communicating face-to-face with mental health professionals) which allows them to have direct face-to-face therapy sessions that is impossible with online resources.

The present study indicates rather interesting outcome revealed individuals with better health tend to engage with MHP-WBHIS. A possibility may be as according to Weaver *et al.* (2010), health is positively related to the search for wellness information and negatively related to the search for illness information. Since in this study, health consumers reported moderate to good state of physical, psychological and overall general health, the finding is significant as the result reported.

7.0 Conclusion

The findings from the study does support HBM through the outcome expectations and internal cues constructs which have showed significant effect on intention to use technology. The findings also confirmed outcome expectations as key predictor towards health consumers' usage intention of MHP-WBHIS. Within the study also, health consumers' state of health had confirmed its significant role in explaining their intention to use MHP. The findings would help Ministry of Health in identifying and understand the critical success factors of MyHEALTH Portal usage which allows them to understand and further enhance and rebrand the portal so that it can be maximally used by the public in the long run. It also helped in coherently understand the role of outcome expectations and external cues towards intention to use which can significantly be benefited by the Ministry in redesigning portal's future strategy to boost MyHEALTH Portal usage among the society.

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